## **Contents**

PREFACE

хi

ACKNOWLEDGMENTS	xiii
Introduction	
Objectives The Problem of Optimal Search Example Outline of Chapters	1 2 3 8
Chapter I Search Model	
<ul> <li>1.1. The Target Distribution</li> <li>1.2. Detection</li> <li>1.3. Basic Search Problem Notes</li> </ul>	17 22 32 34
Chapter II Uniformly Optimal Search Plans	
<ul> <li>2.1. Optimization by the Use of Lagrange Multipliers</li> <li>2.2. Uniformly Optimal Search Plans for Regular Detection Functions</li> <li>2.3. Optimal Search with Uncertain Sweep Width</li> <li>2.4. Uniformly Optimal Search Plans for the General Case Notes</li> </ul>	35 41 59 70 81
Chapter III Properties of Optimal Search Plans	
<ul><li>3.1. An Interpretation of Lagrange Multipliers</li><li>3.2. Maximum Probability Search</li></ul>	84 87

viii		Contents
<ul><li>3.3. Incremental Optin</li><li>3.4. Multiple Constrain</li><li>Notes</li></ul>		91 96 100
Chapter IV Search	with Discrete Effort	
4.2. Uniformly Optima	ted Cost to Find the Target	102 104 110 114 116
Chapter V Optimal	Search and Stop	
	nd Stop with Discrete Effort nd Stop with Continuous Effort	119 130 135
Chapter VI Search	in the Presence of False Targets	
<ul> <li>6.1. False-Target Mod</li> <li>6.2. Criterion for Opti</li> <li>6.3. Optimal Nonadap</li> <li>6.4. Optimization Theo</li> <li>6.5. Examples</li> <li>6.6. Semiadaptive Plan</li> <li>Notes</li> </ul>	mality tive Plans orems	137 145 146 155 162 165
Chapter VII Approx	ximation of Optimal Plans	
<ul><li>7.1. Approximations T</li><li>7.2. Incremental Approximation</li><li>Notes</li></ul>	hat Are Optimal in a Restricted Class oximations	179 189 196
Chapter VIII Condi	tionally Deterministic Target Motion	
8.3. Optimal Plans with	l Plans When the Target Motion Is Factorable	198 202 213 217 219
Chapter IX Markov	ian Target Motion	
9.2. Two-Cell Continuo	Time Markovian Motion ous-Time Markovian Motion Markovian Motion in Euclidean <i>N</i> -Space	222 229 231 233

Contents	ix
Appendix A Reference Theorems	235
Appendix B Necessary Conditions for Constrained Optimization of Separable Functionals	
<ul> <li>B.1. Necessary Conditions for the Discrete Space J</li> <li>B.2. Necessary Conditions for the Continuous Space X</li> <li>Notes</li> </ul>	238 241 244
References	245
Author Index	251
Subject Index	255
Notation Index	259